Volunteer Lake Assessment Program Individual Lake Reports

HIGHLAND LAKE, STODDARD, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	19,008	**Max. Depth (m):**	9.6	**Flushing Rate (yr^{-1})**	10.3
Surface Area (Ac.):	712	**Mean Depth (m):**	1.6	**P Retention Coef:**	0.49
Shore Length (m):	25,300	**Volume (m^3):**	4,721,000	**Elevation (ft):**	1294

TROPHIC CLASSIFICATION

Year	Trophic class
1993	MESOTROPHIC
2004	MESOTROPHIC

KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the 2012 305(b) report on the status of N.H. waters, and are based on data collected from 2001-2011.

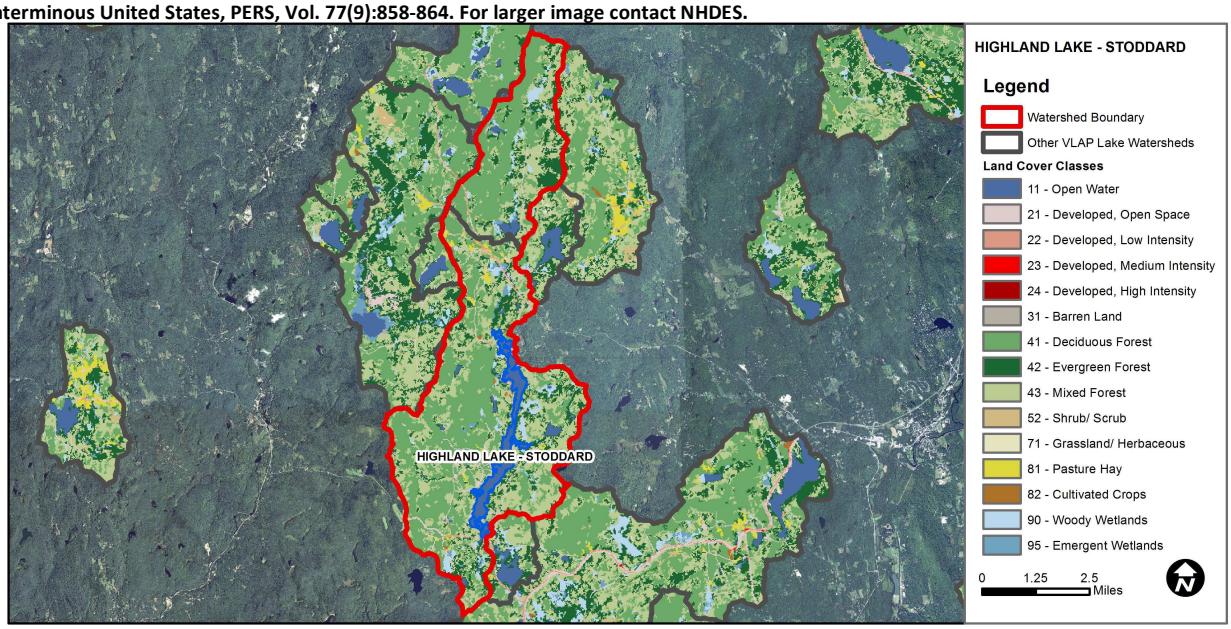
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	>/=5 samples and median is < threshold but > 1/2 threshold value.
	pH	Bad	>10%, with a minimum of 2, samples exceed criteria, with 1 or more by a large margin.
	D.O. (mg/L)	Very Good	At least 10 samples with 0 exceedances of criteria.
	D.O. (% sat)	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Chlorophyll-a	Good	>/=5 samples and median is < threshold but > 1/2 threshold value.
Primary Contact Recreation	E. coli	Good	Geometric means < criteria; however at least 1 exceedance of the single sample criteria occurred.
	Chlorophyll-a	Very Good	At least 10 samples with 0 exceedances of criteria.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

HIGHLAND LAKE-HIGHLAND LAKE BOAT LAUNCH	E. coli	Bad	>/=1 exceedance(s) of geometric mean criterion and/or >/=2 exceedances of single sample criterion, with 1 or more >2X criteria.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	5.2	Barren Land	0	Grassland/Herbaceous	0.05
Developed-Open Space	2.58	Deciduous Forest	39.23	Pasture Hay	0.92
Developed-Low Intensity	0.59	Evergreen Forest	15.01	Cultivated Crops	0.1
Developed-Medium Intensity	0.01	Mixed Forest	31.25	Woody Wetlands	3.49
Developed-High Intensity	0	Shrub-Scrub	0.58	Emergent Wetlands	0.91

VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS
HIGHLAND LAKE, SOUTH STN., STODDARD, NH
2013 DATA SUMMARY

OBSERVATIONS AND RECOMMENDATIONS (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **CHLOROPHYLL-A:** Chlorophyll levels were relatively low, less than the state median, and stable throughout the summer. Historical trend analysis indicates significantly decreasing (improving) chlorophyll since monitoring began. We hope to see this continue!
- **CONDUCTIVITY/CHLORIDE:** Conductivity and chloride were low at all stations and less than the state medians. Historical trend analysis indicates relatively stable epilimnetic conductivity with high variability between years.
- **TOTAL PHOSPHORUS:** Epilimnetic phosphorus was the lowest measured since 1999, less than the state median, and stable throughout the summer. Historical trend analysis indicates stable epilimnetic phosphorus with low variability between years. Tributary average phosphorus levels decreased in 2013 and were in an average range.
- **TRANSPARENCY:** Average transparency improved slightly in 2013 and was good throughout the summer. Historical trend analysis indicates relatively stable transparency with moderate variability between years.
- **TURBIDITY:** Epilimnetic and tributary turbidity levels were relatively low on each sampling event.
- **PH:** Epilimnetic and tributary pH levels were lower than desirable range 6.5 – 8.0 units and potentially critical to aquatic life. Historical trend analysis indicates relatively stable epilimnetic pH with moderate variability between years.
- **RECOMMENDED ACTIONS:** The improving chlorophyll levels and stable water quality trends are good sign and we hope to see this continue. Monitors noticed an increase in aquatic plant growth and some small algal blooms long the shore; however that may be the result of a longer growing season if ice out occurs earlier in the spring. The more frequent high volume and high intensity storm events highlights the need to reduce stormwater runoff into local waterbodies. Educate lake and watershed residents on ways to reduce stormwater runoff from their properties utilizing DES' "Homeowner's Guide to Stormwater Management" tool. Stormwater runoff often contributes nutrients, sediment, bacteria and other harmful pollutants to nearby lakes and streams. Keep up the great work!

Table 1. 2013 Average Water Quality Data for HIGHLAND LAKE, SOUTH STN.

Station Name	Alk.	Chlor-a	Chloride	Cond.	Total P	Trans.		Turb.	pH
	mg/l	ug/l	mg/l	uS/cm	ug/l	m		ntu	
						NVS	VS		
Carr Brook			3	23.2	13			0.92	6.06
Dead Brook			5	33.4	14			0.80	5.93
Kennedy Brook			3	18.8	11			0.63	5.92
Rice Brook			3	22.3	17			0.77	6.00
Epilimnion	1.97	4.09	3	22.1	9	2.85	2.85	0.72	6.07

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: < 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: 6.5-8.0 (unless naturally occurring)

HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation	Parameter	Trend	Explanation
pH	Stable	Trend not significant; data moderately variable.	Chlorophyll-a	Improving	Data significantly decreasing.
Conductivity	Stable	Trend not significant; data highly variable.	Transparency	Stable	Trend not significant; data moderately variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data show low variability.